

Table F3-1. Cost Summary for Sediment Remedial Alternatives.

Alternative	Dredge Volume (cy) <sup>1</sup>	Sediment Weight (t) <sup>2</sup>	Water Volume (Mgal)	Mob/Demob	Mech Dredge & Sediment Handling	Hydraulic Dredge & Sediment Handling	Sediment Transport & Disposal	Thermal Treatment	Subaqueous Cap	CDF	Water Treatment	Misc (H&S; Mitigation)	Post Construction <sup>3</sup>	Planning & Engineering @ 15%	Oversight @ 15%	Contingency @ 20% <sup>4</sup>	Total
SED-2	70,663	38,589	\$17	\$1,151,155	\$5,096,964					\$14,400,902	\$1,905,801	\$1,619,440	\$715,090	\$3,626,140	\$3,626,140	\$4,834,853	\$36,976,485
SED-3A	77,822	33,999	8	\$932,593	\$11,665,778		\$2,702,164		\$2,451,400		\$1,713,075	\$119,440	\$715,090	\$2,937,667	\$2,937,667	\$3,916,890	\$30,091,764
SED-3B	77,822	33,999	8	\$1,071,909	\$10,173,234		\$1,750,243	\$5,230,796	\$2,451,400		\$1,713,075	\$119,440	\$715,090	\$3,376,514	\$3,376,514	\$4,502,019	\$34,480,234
SED-3C	77,822	33,999	70	\$1,132,426		\$11,078,571	\$2,692,814		\$2,560,515		\$6,197,188	\$119,440	\$715,090	\$3,567,143	\$3,567,143	\$4,756,191	\$36,386,521
SED-3D	77,822	33,999	70	\$1,301,571		\$10,227,634	\$1,750,243	\$5,230,796	\$2,506,115				\$715,090	\$4,099,948	\$4,099,948	\$5,466,597	\$41,714,569
SED-4A	133,906	58,500	13	\$1,287,762	\$18,595,427		\$4,634,149				\$2,296,786	\$228,880	\$715,090	\$4,056,451	\$4,056,451	\$5,408,601	\$41,279,596
SED-4B	133,906	58,500	13	\$1,528,250	\$16,025,908		\$3,011,581	\$9,001,843			\$2,296,786	\$228,880	\$715,090	\$4,813,987	\$4,813,987	\$6,418,650	\$48,854,962
SED-4C	133,906	58,500	121	\$1,615,830		\$17,584,105	\$4,436,108				\$10,067,515	\$228,880	\$715,090	\$5,089,866	\$5,089,866	\$6,786,488	\$51,613,748
SED-4D	133,906	58,500	121	\$1,916,784		\$16,025,908	\$3,011,581	\$9,001,792			\$10,067,515	\$228,880	\$715,090	\$6,037,869	\$6,037,869	\$8,050,492	\$61,093,779
SED-5A	133,906	58,500	180	\$2,054,744	\$27,570,933		\$4,984,160				\$7,817,986	\$721,800	\$715,090	\$6,472,443	\$6,472,443	\$10,787,406	\$67,597,005
SED-5B	133,906	58,500	180	\$2,497,981	\$29,056,761		\$3,361,280	\$9,001,800			\$7,817,986	\$721,800	\$715,090	\$7,868,641	\$7,868,641	\$13,114,402	\$82,024,383

1: Includes Wood

2: Without Wood

3: Present Value at 7% Discount Factor

4: A 25% contingency was applied to Alternatives 5A and 5B.

Table F3-2. Alternate SED-2: Construct CDF, Dredge Sediment &gt; PRG into CDF, Cap.

Total Area:	338,091 sq ft	Estimate of 8.8 acres based upon GIS
Total Sediment Volume:	70,663 cy	Based upon GIS Estimate
Total Volume of Wood Waste:	100 cy	Estimate of wood derived from side scan sonar
Total Sediment Weight:	38,589 tons	Based on 65% moisture for disposal
Total Volume of Water:	17 Mgal	Water volume estimate based on displacing the same volume of water as the sediment volume plus 20%

<b>Mob/Demob</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	
Mob/Demob	ls	1	\$1,151,155	<b>\$1,151,155</b>	Estimate at 5% of total costs except without engineering, contingency and LT monitoring

**Construct CDF**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	Includes installation of electric upon completion (\$40k) & move/abandon existing utilities (\$60k)
2	24 hr. Security of Site	weekly	76	\$2,695	\$204,820	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
3	Perimeter Fence	ln ft	2528	\$20	\$50,560	Fence along land side
4	Pre-Trenching Activities	day	17	\$2,826	\$48,042	Pre-trench along landside to 10 ft. Assume 150 ft/day
5	Dispose of debris	ea	2	\$1,500	\$3,000	Dispose of debris in a 20 cy. roll off box
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during sheetpile wall construction using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	Move HC Boom	ft	5460	\$1	\$5,460	Move HC Boom after sheetpile installation (1/4 cost of installation)
10	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
11	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
12	Drive Sheetpile Along Railroad	sq ft	28050	\$48	\$1,357,620	Depth approx 25 ft
13	Drive Sheetpile Along Ellis Ave	sq ft	22378	\$48	\$1,083,071	Depth tapers from 25-40 ft from railroad to lakeside
14	Drive Sheetpile Along Prentice Ave	sq ft	24068	\$48	\$1,164,867	Depth tapers from 25-40 ft from railroad to lakeside
15	Drive Sheetpile in Water	sq ft	56925	\$54	\$3,073,950	Single sheetpile wall. Depth approx 45 ft
16	Demolition and Disposal Existing WWTP	sq ft	41935	\$5	\$209,675	Cost to demolish structure and dispose debris at landfill, does not include disposal of hazardous materials i.e. asbestos
17	Construct Sediment Holding Ponds	cy	21258	\$20	\$425,165	Surface ponds 10 ft. high, 2H:1V side slopes, 595' X 200', 2 ft clay liner, 2 ft freeboard (contingent on type of dredging)
<b>Subtotal</b>					<b>\$7,781,910</b>	Total Volume of Clay Material: 21,258 cy, Total Volume Holding Pond: 22,170 cy

**Mechanical Dredging**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Bathymetric Survey (pre, mid, post)	ea	3	\$37,500	\$112,500	Pre, mid, post Survey
2	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
3	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
5	Dredge Sediments	cy	70663	\$30	\$2,119,890	Dredge >10 ppm volume based on Minneapolis calculations in separate spreadsheet
6	Air Emissions Monitoring	weeks	45	\$8,725	\$392,625	Monitor air quality during construction of CDF, dredging and CDF capping based on 5 stations 3 times/week using NIOSH methods
7	Water Quality Monitoring	weeks	38	\$9,000	\$342,000	Daily turbidity, and TSS and PAHs monitoring weekly through dredging and dike construction activities
8	Installation of Rock Buttress	tons	39872	\$50	\$1,993,600	Install rock buttress during dredging activities for CDF stabilization. (26581 cy rocks X 1.5) =39,872 tons
9	Benthic habitat/thin layer	cy	7075	\$18	\$127,349	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
<b>Subtotal</b>					<b>\$5,096,964</b>	

**Water Treatment**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Sand Filter Capital Cost	ea	1	\$385,000	\$385,000	Stryker Bay cost estimates were used for this estimate. Sand filters are
2	Oil Water Separator	ea	2	\$25,000	\$50,000	dual media with 250 gpm design flow rate with auto backwashing
3	Oil Water Separator O&M	Mgal	17	\$2,700	\$46,238	controls based on vendor quotes. The carbon system would be two
4	Carbon Filtration	Mgal	17	\$67,000	\$1,147,396	10,000 lb beds with manual piping controls and includes the estimated
5	Water Quality Testing	Mgal	17	\$2,400	\$41,101	carbon consumption to average out to \$0.067/gallon cost based on jar
6	O&M	day	98	\$2,400	\$236,066	tests on sediments of Stryker Bay.
<b>Subtotal</b>					<b>\$1,905,801</b>	

**CDF Capping**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
2	Geomembrane	sq ft	773152	\$2	\$1,546,304	40 mil HDPE from shoreline to sheetpile (cost is based on other bids and experience, \$1 for material and \$1 to install/sq ft)
3	Geocomposite	sq ft	773152	\$2	\$1,546,304	Geotextile/geonet composite drainage layer from shoreline to sheetpile, cost based on bids \$1 material and \$1 to install/ sq ft.
4	Sand and clay cap over CDF	cy	50088	\$22	\$1,101,926	1.5 ft. sand plus 2 ft of clay cover under geomembrane from shoreline to sheetpile
5	Top Soil over CDF	cy	6261	\$18	\$112,697	0.5 ft. topsoil cover over sand layer from shoreline to sheetpile
6	Vegetation	acre	7.8	\$3,500	\$27,165	Seeding from shoreline to sheetpile
7	Asphalt	sq. yd.	33733	\$25	\$843,333	Area to be paved (6 inches stone, 3 inches binder, 2 inches surface) over current park along Marina Drive
8	Clay Cover over land	cy	32233	\$22	\$709,137	2 ft. clay cover from shoreline to sheet walls inc. Marina Drive (pavement)
9	Local soil over entire area	cy	57271	\$10	\$572,705	2ft of local soils over clay and membrane cap
10	Top Soil over land	cy	2436	\$18	\$43,851	0.5 ft. topsoil cover over sand layer from shoreline to Marina Drive (pavement)
11	Vegetation on land	acre	3.02	\$3,500	\$10,570	Seeding from shoreline to sheet pile except Marina Drive (pavement) to
12	Stormwater Drainage System	ls	1	\$105,000	\$105,000	For water runoff during storm post-remediation (1300 ft X 2 + 500ft + 4 Catch Basins) = 2600+500=3100 X \$30/sq ft + (4 X 3000) = \$105,000
<b>Subtotal</b>					<b>\$6,618,992</b>	

Table F3-2. Alternate SED-2: Construct CDF, Dredge Sediment &gt; PRG into CDF, Cap.

Misc

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	weeks	76	\$1,440	\$109,440	Once a week, for 2 years (38 weeks/yr)
3	Wetland Mitigation	ls	1	\$1,500,000	\$1,500,000	
				<b>Subtotal</b>	<b>\$1,619,440</b>	
				Total	\$24,174,264	
				Engineering @ 15%:	\$3,626,140	
				Oversight @ 15%:	\$3,626,140	
				Subtotal	\$31,426,543	
				Contingency @ 20%	\$4,834,853	Only taken on Capital Costs not Engineering
				<b>TOTAL</b>	<b>\$36,261,395</b>	

Post Construction

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000	Monitor locations with <20 ppm for length determined by US EPA
2	Reporting	yr	30	\$12,000	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000	\$300,000	Based on contractor estimates
			<b>Subtotal</b>	<b>\$62,000</b>	<b>\$1,860,000</b>	
					<b>\$715,090</b>	

Present worth @ 7% discount factor

**GRAND TOTAL \$36,976,485**Summary (Capital Costs)

	<u>Cost</u>	<u>Cost + Oversight &amp; Engineering</u>	<u>Contingency</u>
Mob/demob & Misc	\$ 2,770,595	\$ 3,601,774	\$ 554,119
Construct CDF	\$ 7,781,910	\$ 10,116,483	\$ 1,556,382
Dredge	\$ 5,096,964	\$ 6,626,054	\$ 1,019,393
Water Treatment	\$ 1,905,801	\$ 2,477,541	\$ 381,160
Complete CDF	\$ 6,618,992	\$ 8,604,690	\$ 1,323,798
<b>Total Estimated Cost</b>	<b>\$ 24,174,264</b>	<b>\$ 31,426,543</b>	<b>\$ 4,834,853</b>

Total Capital Cost With Contingency \$ 36,261,395

Table F3-3. Alternative SED- 3A:Mechanically Dredge Sediments (0-4 ft) &gt; PRG and Cap.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	77,822 cy	Based upon GIS calculations
Total Volume of Wood Waste:	15,564 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	33,999 tons	Weight estimate based on SG = 2.6 dry weight, 65%solids for disposal
Total Volume of Water:	7.79 Mgal	Water volume estimate based on 46% solid content by volume and dewatered to 65% solids plus 20% additional water

**Mob/Demob**

<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
Mob/Demob	1	\$932,593	<b>\$932,593</b>

Estimate at 5% of total costs except without engineering, contingency and LT monitoring

**Mechanical Dredging & Sediment Treatment**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
2	24 hr. Security of Site	weekly	45	\$2,695	\$121,275	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
3	Perimeter Fence	ln ft	2528	\$20	\$50,560	Fence along land side
4	Survey	ea	3	\$37,500	\$112,500	Pre- and Post Dredge and post cap - Bathymetric Survey
5	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	15564	\$45	\$700,398	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Large Wood Waste Disposal	ea	778	\$1,500	\$1,167,330	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (15,564 cy)/20 cy/box
13	Mechanically Dredge Sediment	cy	62258	\$30	\$1,867,728	Mechanically dredge sediments with a concentration greater than the PRG (Includes transport to land cost). Assume MD 200 cy/day of (77,822 - 15,564 cy) affected sediment
14	Screening	day	104	\$2,500	\$259,407	Screening system to separate wood from sediments
15	Air Emissions Monitoring	weeks	45	\$8,725	\$392,625	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	38	\$9,000	\$342,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Filterpress	cy	18677	\$35	\$653,695	Total dredged minus wood and include 20 % for fines only, rate based on bids
18	Stabilization	cy	37258	\$81	\$3,017,866	Cost based on FRTR site guide with 15% cement added. Includes all costs minus mob/demob for a 50,000 yard soil site using RACER software
19	Cap shoreline slope	cy	19259	\$25	\$481,475	2'x100'x1500'
20	Benthic Habitat/Thin layer	cy	10180	\$18	\$183,240	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$11,665,778</b>	

**Transport & Disposal**

<u>Item No.</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
1	Load	day	72	\$1,440
2	Haul to landfill	ton	57539	\$27
3	Disposal	ton	57539	\$18
				<b>Subtotal</b>

\$103,570 40 trucks/day X 20 tons/truck = 800 tons/day  
\$1,562,896 Truck all sediment to Seven Mile LF - Eau Claire  
\$1,035,698 Tipping Fee  
**\$2,702,164**

**Water Treatment:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Pond and Sand Filter Capital Cost	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	7.79	\$2,700	\$21,022	
4	Carbon Sand Filtration	Mgal	7.79	\$67,000	\$521,654	
5	Water Quality Testing	Mgal	7.79	\$2,400	\$18,686	
6	O&M	day	104	\$2,400	\$249,030	
				<b>Subtotal</b>	<b>\$1,713,075</b>	Stryker Bay Cost Estimates (See CDF cost Sheet)

**Capping:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Liner of GCL mat or GAC mat	sq ft	326700	\$1.50	\$490,050	GCL or GAC mat to retard contaminant transport and provide a stable cap base
2	Mat liner installation	sq ft	326700	\$1	\$326,700	Installation of organic clay liner and geosynthetic. Assume 1 acres/day at \$4000/day
3	Stone Cover	ton	18150	\$35	\$635,250	Includes cost for barge. Assumes stone placement same time as sand cover 1 ft thick
5	Sand Cover Fill	cy	6050	\$25	\$151,250	Average of 0.5 ft to level after dredging for mat placement and for thin cap area
6	Sand Cover & install	cy	30250	\$25	\$756,250	2.5 ft sand cover
7	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
8	Survey	ea	1	\$37,500	\$37,500	Post-Capping sand before rock Bathymetric Survey
				<b>Subtotal</b>	<b>\$2,451,400</b>	

**MISC**

				1		
<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	weeks	76	\$1,440	\$109,440	Once a week, for 2 years (38 weeks/yr)
				<b>Subtotal</b>	<b>\$119,440</b>	
				Total:	\$19,584,449	
				Engineering @ 15%:	\$2,937,667	
				Oversight @ 15%:	\$2,937,667	
				Subtotal:	\$25,459,784	
				Contingency @ 20%:	\$3,916,890	Only taken on Capital Costs not Engineering
				<b>TOTAL:</b>	<b>\$29,376,674</b>	

Table F3-3. Alternative SED- 3A:Mechanically Dredge Sediments (0-4 ft) > PRG and Cap.

Post-Construction:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000	\$300,000	Comments from 2 bidders
				<b>Subtotal</b>	<b>\$1,860,000</b>	
	Present worth @ 7% discount factor				<b>\$715,090</b>	

GRAND TOTAL: \$30,091,764

Summary (Capital Costs)	<u>Cost + Oversight</u>		
	<u>Cost</u>	<u>&amp; Engineering</u>	<u>Contingency</u>
Mob/demob & Misc	\$ 1,052,033	\$ 1,367,643	\$ 210,407
Dredge and Sediment Handling	\$ 11,665,778	\$ 15,165,512	\$ 2,333,156
Transport & Disposal	\$ 2,702,164	\$ 3,512,813	\$ 540,433
Water Treatment	\$ 1,713,075	\$ 2,226,997	\$ 342,615
Cap	\$ 2,451,400	\$ 3,186,820	\$ 490,280
<b>Total Estimated Cost</b>	<b>\$ 19,584,449</b>	<b>\$ 25,459,784</b>	<b>\$ 3,916,890</b>
Total Capital Cost With Contingency		\$	29,376,674

Table F3-4. Alternative SED- 3B:Mechanically Dredge Sediments (0-4 ft) &gt; PRG, Cap, Thermally Treat.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	77,822 cy	Based upon GIS calculations
Total Volume of Wood Waste:	15,564 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	33,999 tons	Weight estimate based on SG = 2.6 dry weight, 65%solids for disposal
Total Volume of Water:	7.79 Mgal	Water volume estimate based on 46% solid content by volume to 65% solids plus 20%

**Mob/Demob**

<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>
Mob/Demob	1	\$1,071,909	<b>\$1,071,909</b>

Estimate at 5% of total costs except without engineering, contingency and LT monitoring

**Mechanical Dredging & Sediment Treatment**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
2	24 hr. Security of Site	weekly	45	\$2,695	\$121,275	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
3	Perimeter Fence	ln ft	2528	\$20	\$50,560	Fence along land side
4	Survey	ea	3	\$37,500	\$112,500	Pre- and Post Dredge and Post cap - Bathymetric Survey
5	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	15564	\$45	\$700,398	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Large Wood Waste Disposal	ea	778	\$1,500	\$1,167,330	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (15,564 cy)/20 cy/box
13	Mechanically Dredge Sediment	cy	62258	\$30	\$1,867,728	Mechanically dredge sediments with a concentration greater than the PRG (Includes transport to land cost). Assume MD 200 cy/day of (77,822 - 15,564 cy) affected sediment
14	Screening	day	104	\$2,500	\$259,407	Screening system to separate wood from sediments
15	Air Emissions Monitoring	weeks	45	\$8,725	\$392,625	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	38	\$9,000	\$342,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Mechanical & Gravity Methods	cy	62258	\$35	\$2,179,016	Total dredged minus wood, rate based on bids
18	Cap shoreline slope	cy	19259	\$25	\$481,475	2'x100'x1500'
19	Benthic Habitat/Thin layer	cy	10180	\$18	\$183,240	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$10,173,234</b>	

**Thermal Treatment**

<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>
Thermal Treatment	ton	52308	\$100

Bid of \$80/ton plus misc items \$20/ton = \$100/ton

**Transport & Disposal**

<b>Item No.</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>
1 Load	day	47	\$1,440	\$67,317
2 Haul to landfill	ton	37398	\$27	\$1,009,756
3 Disposal	ton	37398	\$18	\$673,170
				<b>Subtotal</b>

\$1,750,243

**Water Treatment:**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Pond and Sand Filter	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	7.79	\$2,700	\$21,022	Stryker Bay Cost Estimates (See CDF cost Sheet)
4	Carbon Sand Filtration	Mgal	7.79	\$67,000	\$521,654	
5	Water Quality Testing	Mgal	7.79	\$2,400	\$18,686	
6	O&M	day	104	\$2,400	\$249,030	
				<b>Subtotal</b>	<b>\$1,713,075</b>	

**Capping:**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Liner of GCL mat or GAC mat	sq ft	326700	\$1.50	\$490,050	One layer of either geotextile mat to retard contaminant transport and provide a cap base
2	Mat liner installation	sq ft	326700	\$1	\$326,700	Installation of organic clay liner and geosynthetic. Assume 1 acres/day at \$4000/day
4	Stone Cover	ton	18150	\$35	\$635,250	Includes cost for barge. Assumes stone placement same time as sand cover 1 ft thick
5	Sand Cover Fill	cy	6050	\$25	\$151,250	Average of 0.5 ft to level after dredging for mat placement
6	Sand Cover & install	cy	30250	\$25	\$756,250	2.5 ft sand cover
7	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
8	Survey	ea	1	\$37,500	\$37,500	Post-Capping sand before rock-Bathymetric Survey
				<b>Subtotal</b>	<b>\$2,451,400</b>	

**MISC**

<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	week	76	\$1,440	\$109,440	Once a week, for 2 years (38 weeks/yr)
				<b>Subtotal</b>	<b>\$119,440</b>	

Total:	\$22,510,096
Engineering @ 15%:	\$3,376,514
Oversight @ 15%:	\$3,376,514
Subtotal:	\$29,263,125
Contingency @ 20%:	\$4,502,019 Only taken on Capital Costs not Engineering
<b>TOTAL:</b>	<b>\$33,765,144</b>

Table F3-4. Alternative SED- 3B:Mechanically Dredge Sediments (0-4 ft) > PRG, Cap, Thermally Treat.

**Post-Construction:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000	\$300,000	
				<b>Subtotal</b>	<b>\$1,860,000</b>	
					<b>\$715,090</b>	

Present worth @ 7% discount factor

**GRAND TOTAL: \$34,480,234**

<u>Summary</u>	<u>Cost</u>	<u>Cost + Oversight &amp; Engineering</u>	<u>Contingency</u>
Mob/demob & Misc	\$ 1,191,349	\$ 1,548,754	\$ 238,270
Dredge and Sediment Handling	\$ 10,173,234	\$ 13,225,204	\$ 2,034,647
Thermal Treatment	\$ 5,230,796	\$ 6,800,034	\$ 1,046,159
Transport & Disposal	\$ 1,750,243	\$ 2,275,316	\$ 350,049
Water Treatment	\$ 1,713,075	\$ 2,226,997	\$ 342,615
Cap	\$ 2,451,400	\$ 3,186,820	\$ 490,280
<b>Total Estimated Cost</b>	<b>\$ 22,510,096</b>	<b>\$ 29,263,125</b>	<b>\$ 4,502,019</b>
Total Capital Cost With Contingency		\$33,765,144	

Table F3-5. Alternative SED- 3C:Hydraulically Dredge Sediments (0-4 ft) &gt; PRG, Cap.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	77,822 cy	Based upon GIS calculations
Total Volume of Wood Waste:	15,564 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	33,999 tons	Weight estimate based on SG = 2.6 dry weight, 65%solids for disposal
Total Volume of Water:	70 Mgal	Water volume estimate based on 46% solid content by volume to 65% solids plus 20%

**Mob/Demob**

<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
Mob/Demob	1	\$1,132,426	<b>\$1,132,426</b> Estimate at 5% of total costs except without engineering, contingency and LT monitoring

**Hydraulic Dredging & Sediment Treatment**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Survey	ea	3	\$37,500	\$112,500	Pre- and Post Dredge - Bathymetric Survey
2	Move/Abandon Existing Utilities	1	1	\$100,000	\$100,000	
3	24 hr. Security of Site	weekly	45	\$2,695	\$121,275	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
4	Perimeter Fence	in ft	2528	\$20	\$50,560	Fence along land side
5	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	15564	\$45	\$700,398	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Large Wood Waste Disposal	ea	778	\$1,500	\$1,167,330	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (15,564 cy)/20 cy/box
13	Hydraulically Dredge Sediment	cy	62258	\$30	\$1,867,728	Hydraulically dredge sediments with a concentration greater the PRG (Includes transport to land cost). Assume MD 200 cy/day of (77,822 - 15,564 cy) affected sediment
14	Screening	day	104	\$2,500	\$259,407	Screening system to separate wood from sediments
15	Air Emissions Monitoring	weeks	45	\$8,725	\$392,625	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	38	\$9,000	\$342,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Filterpress	cy	62258	\$35	\$2,179,016	Total dredged minus wood, rate based on bids
18	Stabilization	cy	11177	\$81	\$905,337	Total dredged minus wood and include 30 % for fines only, rate based on bids
19	Cap shoreline slope	cy	19259	\$25	\$481,475	2'x100'x1500'
20	Benthic Habitat/Thin layer	cy	10180	\$18	\$183,240	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$11,078,571</b>	

**Transport & Disposal**

<u>Item No.</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
1	Load	day	72	\$1,440
2	Haul to landfill	ton	57539	\$27
3	Disposal	ton	57539	\$18
				<b>Subtotal</b>
				<b>\$2,692,814</b>

**Water Treatment:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Pond and Sand Filter Capital Cost	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	70	\$2,700	\$188,943	
4	Carbon Sand Filtration	Mgal	70	\$67,000	\$4,688,584	Stryker Bay Cost Estimates (See CDF cost Sheet)
5	Water Quality Testing	Mgal	70	\$2,400	\$167,949	
6	O&M	day	104	\$2,400	\$249,030	
				<b>Subtotal</b>	<b>\$6,197,188</b>	

**Capping:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Liner of GCL mat or GAC mat	sq ft	326700	\$1.5	\$490,050	One layer of either geotextile mat to retard contaminant transport and provide a cap base
2	Mat liner installation	sq ft	326700	\$1	\$326,700	Installation of organic clay liner and geosynthetic. Assume 1 acres/day at \$4000/day
4	Stone Cover	ton	18150	\$35	\$635,250	Includes cost for barge. Assumes stone placement same time as sand cover 1 ft thick
5	Sand Cover Fill	cy	10415	\$25	\$260,365	Average of 0.5 ft to level after dredging for mat placement
6	Sand Cover & install	cy	30250	\$25	\$756,250	2.5 ft sand cover
7	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
8	Survey	ea	1	\$37,500	\$37,500	Post-Capping sand before rock-Bathymetric Survey
				<b>Subtotal</b>	<b>\$2,560,515</b>	

**MISC**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	day	76	\$1,440	\$109,440	Once a week, for 2 years (38 weeks/yr)
				<b>Subtotal</b>	<b>\$119,440</b>	
				Total:	\$23,780,954	
				Engineering @ 15%:	\$3,567,143	
				Oversight @ 15%:	\$3,567,143	
				Subtotal:	\$30,915,240	
				Contingency @ 20%:	\$4,756,191	Only taken on Capital Costs not Engineering
				<b>TOTAL:</b>	<b>\$35,671,431</b>	



Table F3-5. Alternative SED- 3C:Hydraulically Dredge Sediments (0-4 ft) > PRG, Cap.

**Post-Construction:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000.00	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000.00	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000.00	\$300,000	
				<b>Subtotal</b>	<b>\$1,860,000</b>	
	Present worth @ 7% discount factor				<b>\$715,090</b>	

**GRAND TOTAL: \$36,386,521**

<u>Summary</u>	<u>Cost</u>	<u>Cost + Oversight &amp; Engineering</u>		<u>Contingency</u>
Mob/demob & Misc	\$ 1,251,866	\$ 1,627,426	\$ 250,373	
Dredge and Sediment Handling	\$ 11,078,571	\$ 14,402,142	\$ 2,215,714	
Transport & Disposal	\$ 2,692,814	\$ 3,500,658	\$ 538,563	
Water Treatment	\$ 6,197,188	\$ 8,056,344	\$ 1,239,438	
Cap	\$ 2,560,515	\$ 3,328,670	\$ 512,103	
<b>Total Estimated Cost</b>	<b>\$ 23,780,954</b>	<b>\$ 30,915,240</b>	<b>\$ 4,756,191</b>	
Total Capital Cost With Contingency		\$ 35,671,431		

Table F3-6. Alternative SED- 3D:Hydraulically Dredge Sediments (0-4 ft), Cap Thermally Treat.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	77,822 cy	Based upon GIS calculations
Total Volume of Wood Waste:	15,564 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	33,999 tons	Weight estimate based on SG = 2.6 dry weight, 65%solids for disposal
Total Volume of Water:	70 Mgal	Water volume estimate based on 46% solid content by volume to 65% solids plus 20%

**Mob/Demob**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
Mob/Demob	ls	1	\$1,301,571	<b>\$1,301,571</b> Estimate at 5% of total costs except without engineering, contingency and LT monitoring

**Hydraulic Dredging**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Survey	ea	3	\$37,500	\$112,500	Pre- and Post Dredge - Bathymetric Survey
2	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
3	24 hr. Security of Site	weekly	45	\$2,695	\$121,275	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
4	Perimeter Fence	In ft	2528	\$20	\$50,560	Fence along land side
2	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	15564	\$45	\$700,398	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Large Wood Waste Disposal	ea	778	\$1,500	\$1,167,330	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (15,564 cy)/20 cy/box
13	Mechanically Dredge Sediment	cy	62258	\$30	\$1,867,728	Hydraulically dredge sediments with a concentration greater than the PRG (Includes transport to land cost). Assume MD 200 cy/day of (77,822 - 15,564 cy) affected sediment
14	Screening	day	104	\$2,500	\$259,407	Screening system to separate wood from sediments
15	Air Emissions Monitoring	weeks	45	\$8,725	\$392,625	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	38	\$9,000	\$342,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Filterpress	cy	62258	\$35	\$2,179,016	Total dredged minus wood, rate based on bids
18	Cap shoreline slope	cy	19259	\$25	\$481,475	2'x100'x1500'
19	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
20	Benthic Habitat/Thin layer	cy	10180	\$18	\$183,240	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$10,227,634</b>	

**Thermal Treatment**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
Thermal Treatment	ton	52308	\$100	<b>\$5,230,796</b> Bid of \$80/ton plus misc items \$20/ton = \$100/ton

**Transport & Disposal**

<u>Item No.</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Load	day	47	\$1,440	\$67,317 40 trucks/day X 20 tons/truck = 800 tons/day
2	Haul to landfill	ton	37398	\$27	\$1,009,756 Weight plus 10% for wetting
3	Disposal	ton	37398	\$18	\$673,170 Weight plus 10% for wetting
				<b>Subtotal</b>	<b>\$1,750,243</b>

*Truck all sediment to Seven Mile LF - Eau Claire***Water Treatment:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Pond and Sand Filter Capital Cost	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	70	\$2,700	\$188,943	
4	Carbon Sand Filtration	Mgal	70	\$67,000	\$4,688,584	Stryker Bay Cost Estimates (See CDF cost Sheet)
5	Water Quality Testing	Mgal	70	\$2,400	\$167,949	
6	O&M	day	104	\$2,400	\$249,030	
				<b>Subtotal</b>	<b>\$6,197,188</b>	

**Capping:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Liner of GCL mat or GAC mat	sq ft	326700	\$1.5	\$490,050	One layer of either geotextile mat to retard contaminant transport and provide a cap base
2	Mat liner installation	sq ft	326700	\$1	\$326,700	Installation of organic clay liner and geosynthetic. Assume 1 acres/day at \$4000/day
4	Stone Cover	ton	18150	\$35	\$635,250	Includes cost for barge. Assumes stone placement same time as sand cover 1 ft thick
5	Sand Cover Fill	cy	10415	\$25	\$260,365	Average of 0.5 ft to level after dredging for mat placement
6	Sand Cover & install	cy	30250	\$25	\$756,250	2.5 ft sand cover
8	Survey	ea	1	\$37,500	\$37,500	Post-Capping Bathymetric Survey
				<b>Subtotal</b>	<b>\$2,506,115</b>	

**MISC**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	day	76	\$1,440	\$109,440	Once a week, for 2 years (38 weeks/yr)
				<b>Subtotal</b>	<b>\$119,440</b>	
				Total:	\$27,332,986	
				Engineering @ 15%:	\$4,099,948	
				Oversight @ 15%:	\$4,099,948	
				Subtotal:	\$35,532,882	
				Contingency @ 20%:	\$5,466,597	Only taken on Capital Costs not Engineering
				<b>TOTAL:</b>	<b>\$40,999,479</b>	

Table F3-6. Alternative SED- 3D:Hydraulically Dredge Sediments (0-4 ft), Cap Thermally Treat.

**Post-Construction:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000.00	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000.00	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000.00	\$300,000	
				<b>Subtotal</b>	<b>\$1,860,000</b>	
					<b>\$715,090</b>	
	Present worth @ 7% discount factor					
	<b>GRAND TOTAL:</b>				<b>\$41,714,569</b>	

<u>Summary</u>	<u>Cost + Oversight &amp; Engineering</u>		
	<u>Cost</u>	<u>Contingency</u>	
Mob/demob & Misc	\$ 1,421,011	\$ 1,847,314	\$ 284,202
Dredge and Sediment Handling	\$ 10,227,634	\$ 13,295,924	\$ 2,045,527
Thermal Treatment	\$ 5,230,796	\$ 6,800,034	\$ 1,046,159
Transport & Disposal	\$ 1,750,243	\$ 2,275,316	\$ 350,049
Water Treatment	\$ 6,197,188	\$ 8,056,344	\$ 1,239,438
Cap	\$ 2,506,115	\$ 3,257,950	\$ 501,223
<b>Total Estimated Cost</b>	<b>\$ 27,332,986</b>	<b>\$ 35,532,882</b>	<b>\$ 5,466,597</b>
Total Capital Cost With Contingency \$ 40,999,479			

Table F3-7. Alternative 4A: Mechanical Dredging of All Sediments &gt; PRG .

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	133,906 cy	Based upon GIS calculations
Total Volume of Large Wood Waste:	26,781 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	58,500 tons	Weight estimate based on SG = 2.6 dry weight, 65% solids for disposal
Total Volume of Water:	13.39 Mgal	Water volume estimate based on 46% solid content by volume and 65% for dewatering, plus 20%

**Mob/Demob**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
Mob/Demob	ls	1	\$1,287,762	<b>\$1,287,762</b> Approx 5% total cost

**Mechanical Dredging & Sediment Treatment**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Survey	ea	2	\$37,500	\$75,000	Pre- and Post- Bathymetric Survey
2	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
3	24 hr. Security of Site	weekly	90	\$2,695	\$242,550	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
4	Perimeter Fence	in ft	2528	\$20	\$50,560	Fence along land side
5	Install sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	26781	\$45	\$1,205,150	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Screening	day	179	\$2,500	\$446,352	Screening system to separate wood from sediments
13	Large Wood Waste Disposal	ea	1339	\$1,500	\$2,008,583	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (26,781 cy)/20 cy/box
14	Dredge Sediment	cy	107124	\$30	\$3,213,733	Mechanically dredge sediments with a concentration greater than the PRG (Includes transport to land cost). Assume MD 200 cy/day of (133,096 - 26,781 cy) affected sediment
15	Air Emissions Monitoring	weeks	90	\$8,725	\$785,250	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	76	\$9,000	\$684,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Filterpress	cy	32137	\$35	\$1,124,795	Total dredged minus wood and 30 % for fines only, rate based on bids
18	Stabilization	cy	64124	\$81	\$5,194,079	Cost based on FRTR site guide with 15% cement added. Includes all costs minus mob/demob for a 50,000 yard soil site using RACER software
19	Cap shoreline slope	cy	38519	\$25	\$962,975	4'x100'x1500' plus 0.5 ft cap in dredge area
20	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
21	Benthic Habitat/Thin layer	cy	12907	\$18	\$232,320	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$18,595,427</b>	

**Transport & Disposal**

<u>Item No.</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>
1 Load	day	124	\$1,440	\$178,236
2 Haul to landfill	ton	99020	\$27	\$2,673,547
3 Disposal	ton	99020	\$18	\$1,782,365
<b>Subtotal</b>				<b>\$4,634,149</b>

**Water Treatment:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Pond and Sand Filter	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	13.39	\$2,700	\$36,160	
4	Carbon Filtration	Mgal	13.39	\$67,000	\$897,304	Stryker Bay Cost Estimates (See CDF cost Sheet)
5	Water Quality Testing	Mgal	13.39	\$2,400	\$32,142	
6	O&M	day	179	\$2,400	\$428,498	
				<b>Subtotal</b>	<b>\$2,296,786</b>	

**Misc:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	day	152	\$1,440	\$218,880	Once a week, for duration of project, doubled based on bidders comments
				<b>Subtotal</b>	<b>\$228,880</b>	
				Total:	\$27,043,004	
				Engineering @ 15%:	\$4,056,451	
				Oversight @ 15%:	\$4,056,451	
				Subtotal:	\$35,155,906	
				Contingency @ 20%:	\$5,408,601	Only taken on Capital Costs not Engineering
				<b>TOTAL:</b>	<b>\$40,564,506</b>	

Table F3-7. Alternative 4A: Mechanical Dredging of All Sediments > PRG .

**Post-Construction:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000.00	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000.00	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000.00	\$300,000	
				<b>Subtotal</b>	<b>\$1,860,000</b>	
					<b>\$715,090</b>	

Present worth @ 7% discount factor

**GRAND TOTAL: \$41,279,596**

<u>Summary</u>	<u>Cost + Oversight</u>		
	<u>Cost</u>	<u>&amp; Engineering</u>	<u>Contingency</u>
Mob/demob & Misc	\$ 1,516,642	\$ 1,971,635	\$ 303,328
Dredge	\$ 18,595,427	\$ 24,174,055	\$ 3,719,085
Transport and Disposal	\$ 4,634,149	\$ 6,024,394	\$ 926,830
Water Treatment	\$ 2,296,786	\$ 2,985,822	\$ 459,357
<b>Total Estimated Cost</b>	<b>\$ 27,043,004</b>	<b>\$ 35,155,906</b>	<b>\$ 5,408,601</b>
Total Capital Cost With Contingency		\$	40,564,506

Table F3-8. Alternative 4B: Mechanical Dredging of All Sediments &gt; PRG, Thermal Treatment.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	133,906 cy	Based upon GIS calculations
Total Volume of Large Wood Waste:	26,781 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	58,500 tons	Weight estimate based on SG = 2.6 dry weight, 65%solids for disposal
Total Volume of Water:	13.4 Mgal	Water volume estimate based on 46% solid content by volume plus 20%

**Mob/Demob**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
Mob/Demob	ls	1	\$1,528,250	<b>\$1,528,250</b>	Approx 5% total cost

**Mechanical Dredging & Sediment Treatment**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Survey	ea	2	\$37,500	\$75,000	Pre- and Post- Bathymetric Survey
2	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
3	24 hr. Security of Site	weekly	90	\$2,695	\$242,550	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
4	Perimeter Fence	ln ft	2528	\$20	\$50,560	Fence along land side
5	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	26781	\$45	\$1,205,150	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Screening	day	179	\$2,500	\$446,352	Screening system to separate wood from sediments
13	Large Wood Waste Disposal	ea	1339	\$1,500	\$2,008,583	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (26,781 cy)/20 cy/box
14	Dredge Sediment	cy	107124	\$30	\$3,213,733	Mechanically dredge sediments with a concentration greater than 10 ppm (Includes transport to land cost). Assume MD 200 cy/day of (133,096 - 26,781 cy) affected sediment
15	Air Emissions Monitoring	weeks	90	\$8,725	\$785,250	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	76	\$9,000	\$684,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Mechanical & Gravity Methods	cy	107124	\$35	\$3,749,355	Total dredged minus wood, rate based on bids
18	cap shoreline slope	cy	38519	\$25	\$962,975	4'x100'x1500' plus 0.5 ft cap in dredge area
19	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
20	Benthic Habitat/Thin layer	cy	12907	\$18	\$232,320	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$16,025,908</b>	

**Thermal Treatment**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
Thermal Treatment	ton	90018	\$100	<b>\$9,001,843</b>	Bid of \$80/ton plus misc items \$20/ton = \$100/ton

**Transport & Disposal**

<u>Item No.</u>		<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Load	day	80	\$1,440	\$115,830	40 trucks/day X 20 tons/truck = 800 tons/day
2	Haul to landfill	ton	64350	\$27	\$1,737,450	Truck all sediment to Seven Mile LF - Eau Claire plus 10% wetting
3	Disposal	ton	64350	\$18	\$1,158,300	Tipping Fee
				<b>Subtotal</b>	<b>\$3,011,581</b>	

**Water Treatment:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Pond and Sand Filter Capital Cost	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	13.4	\$2,700	\$36,160	
4	Carbon Filtration	Mgal	13.4	\$67,000	\$897,304	
5	Water Quality Testing	Mgal	13.4	\$2,400	\$32,142	
6	O&M	day	179	\$2,400	\$428,498	
				<b>Subtotal</b>	<b>\$2,296,786</b>	Stryker Bay Cost Estimates (See CDF cost Sheet)

**Misc:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	day	152	\$1,440	\$218,880	Once a week, for duration of project, doubled based on bidders comments
				<b>Subtotal</b>	<b>\$228,880</b>	
				Total:	\$32,093,248	
				Engineering @ 15%:	\$4,813,987	
				Oversight @ 15%:	\$4,813,987	
				Subtotal:	\$41,721,222	
				Contingency @ 20%:	\$6,418,650	Only taken on Capital Costs not Engineering
				<b>TOTAL:</b>	<b>\$48,139,872</b>	

Table F3-8. Alternative 4B: Mechanical Dredging of All Sediments > PRG, Thermal Treatment.

**Post-Construction:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000	\$300,000	
				<b>Subtotal</b>	<b>\$1,860,000</b>	
					<b>\$715,090</b>	

Present worth @ 7% discount factor

**GRAND TOTAL: \$48,854,962**

<u>Summary</u>	<u>Cost +</u>		
	<u>Cost</u>	<u>Oversight &amp; Engineering</u>	<u>Contingency</u>
Mob/demob & Misc	\$ 1,757,130	\$ 2,284,269	\$ 351,426
Dredge	\$ 16,025,908	\$ 20,833,681	\$ 3,205,182
Thermal Treatment	\$ 9,001,843	\$ 11,702,396	\$ 1,800,369
Transport and Disposal	\$ 3,011,581	\$ 3,915,055	\$ 602,316
Water Treatment	\$ 2,296,786	\$ 2,985,822	\$ 459,357
<b>Total Estimated Cost</b>	<b>\$ 32,093,248</b>	<b>\$ 41,721,222</b>	<b>\$ 6,418,650</b>
Total Capital Cost With Contingency		\$	48,139,872

Table F3-9. Alternative 4C: Hydraulic Dredging of All Sediments &gt; PRG.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	133,906 cy	Based upon GIS calculations
Total Volume of Large Wood Waste:	26,781 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight	58,500 tons	Weight estimate based on SG = 2.6 dry weight, 65% solids for disposal
Total Volume of Water:	121 Mgal	Based upon 10% solids

**Mob/Demob**

	<b><u>Unit</u></b>	<b><u>Quantity</u></b>	<b><u>Unit Costs</u></b>	<b><u>Total</u></b>	<b><u>Notes</u></b>
Mob/Demob	ls	1	\$1,615,830.42	<b>\$1,615,830</b>	Approx 5% total cost

**Mechanical Dredging & Sediment Treatment**

<b><u>Item No.</u></b>	<b><u>Item</u></b>	<b><u>Unit</u></b>	<b><u>Quantity</u></b>	<b><u>Unit Costs</u></b>	<b><u>Total</u></b>	<b><u>Notes</u></b>
1	Survey	ea	2	\$37,500	\$75,000	Pre- and Post- Bathymetric Survey
2	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
3	24 hr. Security of Site	weekly	90	\$2,695	\$242,550	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
4	Perimeter Fence	in ft	2528	\$20	\$50,560	Fence along land side
5	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	26781	\$45	\$1,205,150	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Screening	day	179	\$2,500	\$446,352	Screening system to separate wood from sediments
13	Large Wood Waste Disposal	ea	1339	\$1,500	\$2,008,583	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (26,781 cy)/20 cy/box
14	Dredge Sediment	cy	107124	\$30	\$3,213,733	Mechanically dredge sediments with a concentration greater than 10 ppm (Includes transport to land cost). Assume MD 200 cy/day of (133,096 - 26,781 cy) affected sediment
15	Air Emissions Monitoring	weeks	90	\$8,725	\$785,250	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	76	\$9,000	\$684,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Filterpress	cy	107124	\$35	\$3,749,355	Total dredged minus wood, rate based on bids
18	Stabilization	cy	19237	\$81	\$1,558,197	Cost based on FRTR site guide with 15% cement added. Assumes 30% fines still need stabilization. Includes all costs minus mob/demob for a 50,000 yard soil site using RACER software
19	Cap shoreline slope	cy	38519	\$25	\$962,975	4x100'x1500' plus 0.5 ft cap in dredge area
20	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
21	Benthic Habitat/Thin layer	cy	12907	\$18	\$232,320	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$17,584,105</b>	

**Transport & Disposal**

<b><u>Item No.</u></b>	<b><u>Unit</u></b>	<b><u>Quantity</u></b>	<b><u>Unit Cost</u></b>	<b><u>Total</u></b>	<b><u>Notes</u></b>
1	Load	day	124	\$1,440	\$178,236 40 trucks/day X 20 tons/truck = 800 tons/day
2	Haul to landfill	ton	99020	\$25	\$2,475,507 Sediment weight plus 10% - Truck all sediment to Seven Mile LF - Eau Claire
3	Disposal	ton	99020	\$18	\$1,782,365 Tipping Fee
				<b>Subtotal</b>	<b>\$4,436,108</b>

**Water Treatment:**

<b><u>Item No.</u></b>	<b><u>Item</u></b>	<b><u>Unit</u></b>	<b><u>Quantity</u></b>	<b><u>Unit Cost</u></b>	<b><u>Total</u></b>	<b><u>Notes</u></b>
1	Pond and Sand Filter	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	121	\$2,700	\$327,158	
4	Carbon Filtration	Mgal	121	\$67,000	\$8,118,370	Stryker Bay Cost Estimates (See CDF cost Sheet)
5	Water Quality Testing	Mgal	121	\$2,400	\$290,807	
6	O&M	day	179	\$2,400	\$428,498	
				<b>Subtotal</b>	<b>\$10,067,515</b>	

**Misc:**

<b><u>Item No.</u></b>	<b><u>Item</u></b>	<b><u>Unit</u></b>	<b><u>Quantity</u></b>	<b><u>Unit Cost</u></b>	<b><u>Total</u></b>	<b><u>Notes</u></b>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	week	152	\$1,440	\$218,880	Once a week, for duration of project
				<b>Subtotal</b>	<b>\$228,880</b>	
				Total:	\$33,932,439	
				Engineering @ 15%:	\$5,089,866	
				Oversight @ 15%:	\$5,089,866	
				Subtotal:	\$44,112,171	
				Contingency @ 20%:	\$6,786,488	Only taken on Capital Costs not Engineering
				<b>TOTAL:</b>	<b>\$50,898,658</b>	



Table F3-9. Alternative 4C: Hydraulic Dredging of All Sediments > PRG.

**Post-Construction:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000	\$300,000	
					\$1,860,000	
	Present worth @ 7% discount factor				\$715,090	

**GRAND TOTAL: \$51,613,748**

<u>Summary</u>	<u>Cost + Oversight &amp; Engineering</u>			<u>Contingency</u>	
	<u>Cost</u>				
Mob/demob & Misc	\$ 1,844,710	\$ 2,398,124	\$	368,942	
Dredge	\$ 17,584,105	\$ 22,859,337	\$	3,516,821	
Transport and Disposal	\$ 4,436,108	\$ 5,766,941	\$	887,222	
Water Treatment	\$ 10,067,515	\$ 13,087,769	\$	2,013,503	
<b>Total Estimated Cost</b>	\$ 33,932,439	\$ 44,112,171	\$	6,786,488	
Total Capital Cost With Contingency \$ 50,898,658					

Table F3-10. Alternative 4D: Hydraulic Dredging of All Sediments &gt; PRG, Thermal Treatment.

Total Area:	696,960 sq ft	Based upon GIS calculations
Total Sediment Volume:	133,906 cy	Based upon GIS calculations
Total Volume of Large Wood Waste:	26,781 cy	Assume large wood waste is 20% of total sediments
Total Sediment Weight:	58,500 tons	(Weight estimate based on SG = 2.6 dry weight, 65%solids for disposal)
Total Volume of Water:	121 Mgal	(Water volume estimate based on 46% solid content by volume)

**Mob/Demob**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
Mob/Demob	ls	1	\$1,916,784	<b>\$1,916,784</b>	Approx 5% total cost

**Mechanical Dredging & Sediment Treatment**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Survey	ea	2	\$37,500	\$75,000	Pre- and Post- Bathymetric Survey
2	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	
3	24 hr. Security of Site	weekly	90	\$2,695	\$242,550	\$15/hr X 24 hr X 7 days + \$25/day (expenses)
4	Perimeter Fence	ln ft	2528	\$20	\$50,560	Fence along land side
5	Install Sheet pile outside dredge area	sq ft	45000	\$48	\$2,160,000	Install sheet pile wall instead of silt curtains
6	Install HC Boom	ft	5460	\$4	\$21,840	Install HC Boom on both sides of the wall in water pre-wall installation activities on both sides of sheetpile & 200 ft on each shore
7	HC Boom Debris Disposal Labor	ea	2	\$3,000	\$6,000	Remove debris twice during dredging using a barge
8	Debris Disposal	ea	2	\$1,500	\$3,000	Dispose of debris in 20 cy. roll off box
9	HC Boom Removal	ft	5460	\$4	\$21,840	Removal of HC Boom into roll off box
10	Dispose of Boom	ea	2	\$1,500	\$3,000	Dispose of HC Boom in two 20 cy. roll off boxes
11	Large Wood Waste Removal	cy	26781	\$45	\$1,205,150	Assume removal of large debris will take 20% of the total at 1.5 times the dredge rate or 45/cy
12	Screening	day	179	\$2,500	\$446,352	Screening system to separate wood from sediments
13	Large Wood Waste Disposal	ea	1339	\$1,500	\$2,008,583	Dispose of large debris in a 20 cy. roll off box. Assume 20% is large waste = (26,781 cy)/20 cy/box
14	Dredge Sediment	cy	107124	\$30	\$3,213,733	Mechanically dredge sediments with a concentration greater than 10 ppm (Includes transport to land cost). Assume MD 200 cy/day of (133,096 - 26,781 cy) affected sediment
15	Air Emissions Monitoring	weeks	90	\$8,725	\$785,250	Monitor air quality during construction and dredging based on 5 stations 3 times/week using NIOSH methods
16	Water Quality Monitoring	weeks	76	\$9,000	\$684,000	Daily Water Quality Monitoring through dredging process (including time to remove large wood waste)
17	Dewatering - Filterpress	cy	107124	\$35	\$3,749,355	Total dredged minus wood, rate based on bids
18	cap shoreline slope	cy	38519	\$25	\$962,975	4'x100'x1500' plus 0.5 ft cap in dredge area
19	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	4'-2600 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1360 tons @ 130 pcf
20	Benthic Habitat/Thin layer	cy	12907	\$18	\$232,320	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
				<b>Subtotal</b>	<b>\$16,025,908</b>	

**Thermal Treatment**

	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
Thermal Treatment	ton	90018	\$100	<b>\$9,001,792</b>	Bid of \$80/ton plus misc items \$20/ton = \$100/ton

**Transport & Disposal**

<u>Item No.</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Load	day	80	\$1,440	\$115,830 40 trucks/day X 20 tons/truck = 800 tons/day
2	Haul to landfill	ton	64350	\$27	\$1,737,450 Sediment weight plus 10% wetting - Truck all sediment to Seven Mile LF - Eau Claire
3	Disposal	ton	64350	\$18	\$1,158,300 Tipping Fee
				<b>Subtotal</b>	<b>\$3,011,581</b>

**Water Treatment:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Pond and Sand Filter Capital Cost	ea	1	\$852,682	\$852,682	
2	Oil Water Separator	ea	2	\$25,000	\$50,000	
3	Oil Water Separator O&M	Mgal	121	\$2,700	\$327,158	
4	Carbon Filtration	Mgal	121	\$67,000	\$8,118,370	Stryker Bay Cost Estimates (See CDF cost Sheet)
5	Water Quality Testing	Mgal	121	\$2,400	\$290,807	
6	O&M	day	179	\$2,400	\$428,498	
				<b>Subtotal</b>	<b>\$10,067,515</b>	

**Misc:**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	\$100/hr X 40 hr/wk X 2.5 weeks
2	Health & Safety Personnel	week	152	\$1,440	\$218,880	Once a week, for duration of project
				<b>Subtotal</b>	<b>\$228,880</b>	

Total:	\$40,252,459
Engineering @ 15%:	\$6,037,869
Oversight @ 15%:	\$6,037,869
Subtotal:	\$52,328,197
Contingency @ 20%:	\$8,050,492 Only taken on Capital Costs not Engineering
<b>TOTAL:</b>	<b>\$60,378,689</b>

Table F3-10. Alternative 4D: Hydraulic Dredging of All Sediments > PRG, Thermal Treatment.

Post-Construction:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000.00	\$1,200,000	Monitor locations with PRG for length determined by US EPA
2	Reporting	yr	30	\$12,000.00	\$360,000	Post-Closure Reporting
3	O&M	yr	30	\$10,000.00	\$300,000	
				<b>Subtotal</b>	<b>\$1,860,000</b>	
Present worth @ 7% discount factor					<b>\$715,090</b>	

GRAND TOTAL: \$61,093,779

<u>Summary</u>	<u>Cost +</u>		
	<u>Cost</u>	<u>Oversight &amp; Engineering</u>	<u>Contingency</u>
Mob/demob & Misc	\$ 2,145,664	\$ 2,789,363	\$ 429,133
Dredge	\$ 16,025,908	\$ 20,833,681	\$ 3,205,182
Thermal Treatment	\$ 9,001,792	\$ 11,702,329	\$ 1,800,358
Transport and Disposal	\$ 3,011,581	\$ 3,915,055	\$ 602,316
Water Treatment	\$ 10,067,515	\$ 13,087,769	\$ 2,013,503
<b>Total Estimated Cost</b>	<b>\$ 40,252,459</b>	<b>\$ 52,328,197</b>	<b>\$ 8,050,492</b>
Total Capital Cost With Contingency \$ 60,378,689			

Table F3-11. Alternative 5A: Dry Excavation of all Sediments &gt; PRG

Total Area:	696,960	sq ft	Based upon GIS calculations Includes volume of water in sediments (Weight estimate based on SG = 2.6 dry weight, 75% volume reduction)
Total Wet Sediment Volume:	133,906	cu yd	
Total Dry Sediment Weight:	58,500	tons	
Estimated Volume of Water to be Treated:	180	Mgal	

**Mobilization/Demobilization**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Mob/Demob	ls	1	\$2,054,744	\$2,054,744	Approx 5% total cost
<b>Subtotal, Mobilization/Demobilization</b>					<b>\$2,054,744</b>	

**Sediment Removal and Treatment****Pre-Construction Activities**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Perimeter Fence	lf	1680	\$20	\$33,600	Fence along land side where there is no sheet pile wall (with 20 ft overlap), back to the railroad tracks
2	Pre- and Post-Bathymetric Survey	ea	2	\$37,500	\$75,000	
3	Pretrenching along Proposed Landward Sheet Pile Alignment	day	15	\$1,800	\$27,000	2680 lft at appx 200 lft per day
4	Removal of Existing Site Features	ls	1	\$100,000	\$100,000	
5	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	Includes installation of electric upon completion (\$40k) & move/abandon existing utilities (\$60k)
<b>Subtotal</b>					<b>\$335,600</b>	

**Containment with Pipe and Sheet Pile System at 2900N, Wave Attenuator**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	2,200 linear feet of WhisprWave® Floating Wave Attenuator	ls	1	\$502950	\$5,029,950	Purchase, ship, and install wave attenuator device
2	Install HC Boom in Lake	lf	1770	\$4	\$7,080	Install HC Boom on one side of piling and extend to shorelines
3	Pipe / AZ Combined Wall System in Bay	sec	184	\$24,880	\$4,583,158	PA36/13 pipe/sht piling (Pipe) 142.7 lb/ft x 61 ft + (sheeting) 22.02 lb/ft2 x 231 ft2 = 13800 lbs @ \$0.80/lb = \$11,040 + \$1400 (seal) = \$12,4 Length, ft: 1400
4	West Sheetpiling	sf	49920	\$62	\$3,095,040	Includes \$56 sq/ft for PZ35 piling (35lbs/sq ft @ \$0.80/lb + \$28 for in: Length, ft: 960
5	East Sheetpiling	sf	21615	\$62	\$1,340,130	Includes \$56 sq/ft for PZ35 piling (35lbs/sq ft @ \$0.80/lb + \$28 for in: Length, ft: 655
6	South Sheetpiling	sf	31455	\$62	\$1,950,210	Includes \$56 sq/ft for PZ35 piling (35lbs/sq ft @ \$0.80/lb + \$28 for in: Length, ft: 1165
7	Remove HC Boom from Lake	lf	1770	\$4	\$7,080	Remove HC Boom on one side of piling and extend to shorelines
8	Dispose HC Boom	ea	3	\$1,500	\$4,500	Dispose of HC Boom in 20 cy. roll off boxes
9	Silt Fence	lf	1640	\$20	\$32,800	Along south, east, and west sides of Kreher Park, back to the railroad track, beyond the sheetpile wall
<b>Subtotal</b>					<b>\$16,049,948</b>	

**Sediment Drainage Pad**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Asphalt Drainage Pad Construction	sq yd	4170	\$45	\$187,650	150 ft x 250 ft = 37,500 sq ft = 4,170 sq yd
2	Pumping excess/drained water to WWTP	day	670	\$300	\$201,000	
<b>Subtotal</b>					<b>\$388,650</b>	

**Sediment Removal**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Cutoff and Remove Old Pilings	ea	40	\$500	\$20,000	58,500 tons dry sediments x 50% increase to account for moisture in the sediments = 87,750 tons, assumes ~300 tons are removed per day
2	Remove Existing Shoreline Riprap	ton	7500	\$20	\$150,000	
3	Crane w/ dragline	day	300	\$4,500	\$1,350,000	
4	Dozers (2)	day	300	\$3,600	\$1,080,000	
5	Excavators (2)	day	300	\$3,600	\$1,080,000	2 Dozers at \$1800 per day per dozer
6	Conveyors (4)	day	150	\$2,000	\$300,000	
7	Confirmation Samples	ea	400	\$200	\$80,000	2 Excavators at \$1800 per day per excavator
8	Air Emissions Monitoring	weeks	60	\$8,725	\$523,500	
9	Temporary Barriers	ea	100	\$1,500	\$150,000	
<b>Subtotal</b>					<b>\$4,733,500</b>	Monitor air quality during sediment removal based on 5 stations 3 times/week using NIOSH methods Jersey barriers to provide separation of areas

**Waste Separation/Stabilization**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Remove Large Wood/Debris Waste	day	300	\$1,800	\$540,000	Load at \$1800/day for period of ~300 days of sediment processing
2	Dispose Large Wood/Debris Waste at 20 cu yd per roll-off box	ea	1340	\$1,500	\$2,010,000	
3	Waste Sampling for Landfilling	ea	10	\$400	\$4,000	Dispose of large debris as special waste in a 20 cy. roll off box. Assume 20% is large waste = (26,781 cy)/20 cy/box = 1,340 boxes
4	Mixing Reagent for Stabilization	cu yd	64124	\$35	\$2,244,340	
5	Flexible Hose/Pipe for Reagent	lf	1520	\$10	\$15,200	Reagent and mixing costs combined; assume 2/3 of remaining sediments needs to be stabilized (87750 tons / 1.5 tons/cu yd = 58500 cu yd * 2/3 = 39,000 cu yd)
<b>Subtotal</b>					<b>\$4,813,540</b>	

**Shoreline Restoration**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Place 0.5 ft Clean Sand in Bay + 30,000 cu yds Near Shore	cu yd	38519	\$25	\$962,975	8'x2'100'x2600'
2	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2500 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1300 tons @ 130 pcf
3	Benthic Habitat/Thin layer	cy	12907	\$18	\$232,320	
<b>Subtotal</b>					<b>\$1,249,695</b>	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.

**Subtotal, Sediment Removal and Treatment** **\$27,570,933**

Table F3-11. Alternative 5A: Dry Excavation of all Sediments &gt; PRG

**Water Removal and Treatment****Ground Water Capture System Upgradient of Containment Wall**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Trench Excavation	lf	1165	\$50	\$58,250	18 ft deep by 3 ft wide
2	Contaminated Soil Disposal	tons	3495	\$60	\$209,700	Dispose as special waste at \$60/ton; Assumes 1.5 tons/cu yd
3	Trench Filter Fabric	sf	48930	\$1	\$48,930	Fabric along both sides and the bottom of the trench, and between the gravel backfill and the overlying soil backfill material
4	Gravel Backfill	tons	2718	\$20	\$54,367	From 4 ft to ~18 ft bgs, 3 ft wide; 1.5 tons/cu yd
5	Collection Pipe, 4-in HDPE Perforated	lf	1245	\$30	\$37,350	1165 ft of pipe in trench, 4 - 20 ft segments from the sumps to the header
6	Trenching, Backfill, and Compaction	cu yd	518	\$20	\$10,356	Soil material above the gravel in the trench; from 0 to 4 ft bgs; 1.5 tons/cu yd
7	Discharge Piping, 6-in HDPE	lf	1335	\$38	\$50,730	1165 ft of header pipe placed on ground surface, 170 ft from header pipe to WWTP
8	Connection to Sanitary Pump Station	ea	1	\$2,000	\$2,000	
9	Water Samples	ea	100	\$200	\$20,000	
10	Collection Sump	ea	4	\$2,000	\$8,000	
11	Sump Pump	ea	4	\$4,500	\$18,000	
12	Sump Level Controls	ea	4	\$2,500	\$10,000	
13	Electrical Conduit	lf	1245	\$10	\$12,450	1065 ft of conduit pipe placed on ground surface, and 4 - 20 ft segments from the sumps to the header
14	Misc. Electrical	ls	1	\$10,000	\$10,000	
15	Grout Ground Water Treatment System Trench at end of Project	cu yd	820	\$25	\$20,500	18 ft deep, 3 ft wide, 1165 lf; assumes 35% void space
				<b>Subtotal</b>	<b>\$570,632</b>	

**Lake Water Removal System Inside of Containment**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	2 Pumps at 500 gpm w/ Operator to initially Drain Bay	day	50	\$7,840	\$392,000	[\$85/hr x 8 hrs + 127.50/hr x 16 hr + \$1200/day pump] x 2; ~60,000,000 gal in Bay; 2 - 500gpm pumps = 1,440,000 gpd; added 8 add'l days for rain, gw, and lake water infiltration
2	Sump pumps variable discharge 10 to 100 gpm	ea	8	\$4,500	\$36,000	Dewater sediments
3	Collection/discharge piping, 12-in HDPE	lf	3280	\$5.50	\$18,040	Two collection pipes runs on land along Bay from the NW and NE corners of the Bay until reaching WWTP; Discharge pipe runs to the east to Lake Superior (east of the containment area)
4	Connection to WWTP	ea	3	\$2,000	\$6,000	Two intake connections from each side of the Bay (West and East), one outgoing connection for treated water going to Lake Superior
5	Start-up Samples	ea	200	\$200	\$40,000	
6	Electrical Conduit	lf	1450	\$10	\$14,500	Runs on land along Bay to the west and east, connects up with the Ground Water Capture System conduit to the south
7	Connection to City Power Supply	ls	1	\$20,000	\$20,000	Connection and transformer
8	1 500 gpm Pump w/ Operator to Drain Bay 4 weeks each Spring	day	84	\$3,920	\$329,280	[\$85/hr x 8 hrs + 127.50/hr x 16 hr + \$1200/day pump] x 1; Assumes there will be 3 unworked winters between 4 working seasons
				<b>Subtotal</b>	<b>\$855,820</b>	

**Ground/Lake Water Treatment System**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
<b>Year 2 Startup</b>						
	Carbon Adsorber System (1500 gpm)					Start-up is for approximately 50 days in Year 2 and 28 days in subsequent years 3 and 4.
1	Rental Initiation: mobilization, set-up, carbon	ea	2	\$49,335	\$98,670	Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
2	Rental*	Months	6	\$5,000	\$30,000	*There is a three month minimum rental for each of the two units
3	Rental Termination: carbon removal, demobilization	ea	2	\$41,935	\$83,870	
4	Oil Water Separator and associated system (200 gpm) (purchase)	ea	1	\$30,000	\$30,000	
5	Fuel and energy surcharge (estimated 8.65%)	ea	2	\$10,490	\$20,980	
6	Connecting piping, pumps, accessories	ea	1	\$20,000	\$20,000	
7	Operation and Maintenance (labor)	hours	900	\$100	\$90,000	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
	<b>Subtotal</b>				<b>\$373,520</b>	
<b>Year 2 During and After Startup</b>						
	Carbon Adsorption System and Bag System for Filtration (200 gpm)					Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
1	Rental Initiation: mobilization, set-up, carbon	ea	1	\$28,675	\$28,675	
2	Rental**	Months	6	\$1,500	\$9,000	**Six months for each units plus the first month that comes with the rental for a total of seven months use-time.
3	Rental Termination: carbon removal, system disassembly, demob	ea	1	\$39,350	\$39,350	
4	Carbon Exchange Rate	gallons	30000000	\$0.067	\$2,010,000	
5	BF-400 Four Bag Filter Skid	Months	7	\$4,000	\$28,000	
6	Filter Bags (5 micron rating) - Bag of 50	Cases	8	\$600	\$4,800	
7	Fuel and energy surcharge (estimated 8.65%)	ea	1	\$163,365	\$163,365	All filter bags will fill with fines and have to be disposed as special waste. Assumed average cost is \$60/ton.
8	Dispose soil in filter bags (special waste)	tons	17	\$60	\$1,020	Oil from oil/water separator will be collected in a 55 gallon drum and disposed as necessary.
9	Oil Disposal	gallons	200	\$3	\$600	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
10	Operation and Maintenance (labor)	hours	2150	\$100	\$215,000	
	<b>Subtotal</b>				<b>\$2,519,810</b>	
<b>Year 3, 4 Startup</b>						
	Carbon Adsorber System (1500 gpm)					Start-up is for approximately 50 days in Year 2 and 28 days in subsequent years 3 and 4.
1	Rental Initiation: mobilization, set-up, carbon	ea	4	\$49,335	\$197,340	Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
2	Monthly rental*	Months	12	\$5,000	\$60,000	*There is a three month minimum rental for each of the two units
3	Rental Termination: carbon removal, demobilization	ea	4	\$41,935	\$167,740	
4	Fuel and energy surcharge (estimated at 8.65%)	ea	2	\$18,385	\$36,769	
5	Operation and Maintenance (labor)	hours	1200	\$100	\$120,000	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
	<b>Subtotal</b>				<b>\$581,849</b>	
<b>Year 3, 4 During and After Startup</b>						
	Carbon Adsorption System and Bag System for Filtration (200 gpm)					Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
1	Rental Initiation: mobilization, set-up, carbon	ea	2	\$28,675	\$57,350	
2	Monthly rental**	Months	12	\$1,500	\$18,000	**Six months for each units plus the first month that comes with the rental for a total of seven months use-time.
3	Rental Termination: carbon removal, system disassembly, demob	ea	2	\$39,350	\$78,700	
4	Carbon Exchange Rate	gallons	30000000	\$0.067	\$2,010,000	
5	BF-400 Four Bag Filter Skid	Months	14	\$4,000	\$56,000	
6	Filter Bags (5 micron rating) - Bag of 50	Cases	16	\$600	\$9,600	
7	Fuel and energy surcharge (estimated 8.65%)	ea	2	\$96,432	\$192,865	All filter bags will fill with fines and have to be disposed as special waste. Assumed average cost is \$60/ton.
8	Dispose soil in filter bags (special waste)	tons	34	\$60	\$2,040	Oil from oil/water separator will be collected in a 55 gallon drum and disposed as necessary.
9	Oil Disposal	gallons	600	\$3	\$1,800	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
10	Operation and Maintenance (labor)	hours	4900	\$100	\$490,000	
	<b>Subtotal</b>				<b>\$2,916,355</b>	
	<b>Subtotal</b>				<b>\$6,391,534</b>	Total for 3 years
	<b>Subtotal, Water Removal and Treatment</b>				<b>\$7,817,986</b>	

**Sediment Transport and Disposal**

Table F3-11. Alternative 5A: Dry Excavation of all Sediments &gt; PRG

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Load,	ton	124	\$1,440.00	\$178,560	One-third of total weight wet (87750 / 3) = 29250 tons Assumes 20% weight increase for stabilized waste = 39000 cu yd x 1.2 = 46800 cu yd * 1.5 tons/cu yd = 70200 tons
2	Haul to Landfill	ton	99020	\$27.00	\$2,673,540	
3	Disposal of NAPL offsite	ton	99020	\$18.00	\$1,782,360	
4	Disposal of NAPL offsite	gal	5000	\$8	\$40,000	Same units used in 1998 cost
5	Cut Perimeter Sheet Pile Wall and Dispose of Piling	sf	10720	\$25	\$268,000	Three sides of site; 4 ft x 2680 lf = 10,720 sq ft
6	Remove Asphalt Drainage Pad and Dispose	sq yd	4170	\$10	\$41,700	
<b>Subtotal, Sediment Transport and Disposal</b>					<b>\$4,984,160</b>	
<b>Miscellaneous</b>						
<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Develop HASP	ls	1	\$10,000	\$10,000	Once a week for duration of project; 3.8 years of work * 52 wks / yr * 7/12 (working 7 months of the year) \$15/hr X 24 hr X 7 days + \$25/day (expenses); 3.8 years of work * 52 wks / yr
2	Health & Safety Personnel	wk	120	\$1,440	\$172,800	
3	24 hr Security of Site	wk	200	\$2,695	\$539,000	
<b>Subtotal, Miscellaneous</b>					<b>\$721,800</b>	
Subtotal:					\$43,149,623	
Engineering @ 15%:					\$6,472,443	
Oversight @ 15%:					\$6,472,443	
Subtotal:					\$56,094,510	
Contingency @ 25%:					\$10,787,406	
<b>TOTAL:</b>					<b>\$66,881,915</b>	
<b>Post-Construction</b>						
<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000	Monitor locations with PRG for length determined by US EPA Post-Closure Reporting
2	Reporting	yr	30	\$12,000	\$360,000	
3	O&M	yr	30	\$10,000	\$300,000	
<b>Subtotal, Post-Construction</b>					<b>\$1,860,000</b>	
Present worth @ 7% discount factor					<b>\$715,090</b>	
<b>GRAND TOTAL:</b>					<b>\$67,597,005</b>	

Table F3-12. Alternative 5B: Dry Excavation of all Sediments &gt; PRG, Thermal Treatment

Total Area:	696,960	sq ft	Based upon GIS calculations Includes volume of water in sediments (Weight estimate based on SG = 2.6 dry weight, 75% volume reduction)
Total Wet Sediment Volume:	133,906	cu yd	
Total Dry Sediment Weight:	58,500	tons	
Estimated Volume of Water to be Treated:	180	Mgal	

**Mobilization/Demobilization**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Mob/Demob	ls	1	\$2,497,981	\$2,497,981	Approx 5% total cost
<b>Subtotal, Mobilization/Demobilization</b>					<b>\$2,497,981</b>	

**Sediment Removal****Pre-Construction Activities**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Perimeter Fence	lf	1680	\$20	\$33,600	Fence along land side where there is no sheet pile wall (with 20 ft overlap), back to the railroad tracks
2	Pre- and Post-Bathymetric Survey	ea	2	\$37,500	\$75,000	
3	Pretrenching along Proposed Landward Sheet Pile Alignment	day	15	\$1,800	\$27,000	2680 lft at appx 200 lft per day
4	Removal of Existing Site Features	ls	1	\$100,000	\$100,000	
5	Move/Abandon Existing Utilities	ls	1	\$100,000	\$100,000	Includes installation of electric upon completion (\$40k) & move/abandon existing utilities (\$60k)
<b>Subtotal</b>					<b>\$335,600</b>	

**Containment with Pipe and Sheet Pile System at 2900N, Wave Attenuator**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	2,200 linear feet of Whisp/Wave® Floating Wave Attenuator	ls	1	\$502,950	\$5,029,950	Purchase, ship, and install wave attenuator device
2	Install HC Boom in Lake	lf	1770	\$4	\$7,080	Install HC Boom on one side of piling and extend to shorelines
3	Pipe / AZ Combined Wall System in Bay	sec	184	\$24,880	\$4,583,158	PA36/13 pipe/sht piling(Pipe)142.7 lb/ft x 61 ft + (sheeting)22.02 lb/ft2 x 231 ft2 = 13800 lbs @ \$0.80/lb = \$11,040 + \$1400 (seal) = \$12, Length,ft: 1400
4	West Sheetpiling	sf	49920	\$62	\$3,095,040	Includes \$56 sq/ft for PZ35 piling (35lbs/sq ft @ \$0.80/lb + \$28 for in Length,ft: 960
5	East Sheetpiling	sf	21615	\$62	\$1,340,130	Includes \$56 sq/ft for PZ35 piling (35lbs/sq ft @ \$0.80/lb + \$28 for in Length,ft: 655
6	South Sheetpiling	sf	31455	\$62	\$1,950,210	Includes \$56 sq/ft for PZ35 piling (35lbs/sq ft @ \$0.80/lb + \$28 for in Length,ft: 1165
7	Remove HC Boom from Lake	lf	1770	\$4	\$7,080	Remove HC Boom on one side of piling and extend to shorelines
8	Dispose HC Boom	ea	3	\$1,500	\$4,500	Dispose of HC Boom in 20 cy. roll off boxes
9	Silt Fence	lf	1640	\$20	\$32,800	Along south, east, and west sides of Kreher Park, back to the railroad track, beyond the sheetpile wall
<b>Subtotal</b>					<b>\$16,049,948</b>	

**Sediment Drainage Pad**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Asphalt Drainage Pad Construction	sq yd	4170	\$45	\$187,650	150 ft x 250 ft = 37,500 sq ft = 4,170 sq yd
2	Pumping excess/draind water to WWTP	day	670	\$300	\$201,000	
<b>Subtotal</b>					<b>\$388,650</b>	

**Sediment Removal**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Cutoff and Remove Old Pilings	ea	40	\$500	\$20,000	
2	Remove Existing Shoreline Riprap	ton	7500	\$20	\$150,000	
3	Crane w/ dragline	day	300	\$4,500	\$1,350,000	58,500 tons dry sediments x 50% increase to account for moisture in the sediments = 87,750 tons, assumes ~300 tons are removed per day
4	Dozers (2)	day	300	\$3,600	\$1,080,000	2 Dozers at \$1800 per day per dozer
5	Excavators (2)	day	300	\$3,600	\$1,080,000	2 Excavators at \$1800 per day per excavator
6	Conveyors (4)	day	150	\$2,000	\$300,000	4 Conveyors at \$500 per day per conveyor
7	Confirmation Samples	ea	400	\$200	\$80,000	
8	Air Emissions Monitoring	weeks	60	\$8,725	\$523,500	Monitor air quality during sediment removal based on 5 stations 3 times/week using NIOSH methods
9	Temporary Barriers	ea	100	\$1,500	\$150,000	Jersey barriers to provide separation of areas
10	Remove Large Wood/Debris Waste	day	300	\$1,800	\$540,000	Load at \$1800/day for period of ~300 days of sediment processing
11	Dispose Large Wood/Debris Waste at 20 cu yd per roll-off box	ea	1340	\$1,500	\$2,010,000	Dispose of large debris as special waste in a 20 cy. roll off box. Assume 20% is large waste = (26,781 cy)/20 cy/box = 1,340 boxes
<b>Subtotal</b>					<b>\$7,283,500</b>	

**Sediment Dewatering**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	Dewatering - Filterpress	cy	107125	\$35	\$3,749,368	Total dredged minus wood, rate based on bids
<b>Subtotal</b>					<b>\$3,749,368</b>	

**Shoreline Restoration**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>	<u>Notes</u>
1	cap shoreline slope	cu yd	38519	\$25	\$962,975	Area of Bay ~912,600 sq ft; 912600 ft2 x 0.5 ft / 27 yd3/ft3 = 16,900 cu yd + 30,000 cu yd = 46,900 cu yd
2	Install Rip-Rap Shore Protection	ton	1360	\$40	\$54,400	~2500 lf of shoreline inside 2900N, 8ft wide, 1 ft thick rip-rap = 20,800 cu ft of rip-rap = 1300 tons @ 130 pcf
3	Benthic Habitat/Thin layer	cy	12907	\$18	\$232,320	Apply 0.5 ft of fish mix @ \$18/cy (Stryker Bay estimates) to dredge area.
<b>Subtotal</b>					<b>\$1,249,695</b>	

**Subtotal, Sediment Removal \$29,056,761****Water Removal and Treatment****Ground Water Capture System Upgradient of Containment Wall**

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total</u>	<u>Notes</u>
1	Trench Excavation	lf	1165	\$50	\$58,250	18 ft deep by 3 ft wide
2	Contaminated Soil Disposal	tons	3495	\$60	\$209,700	Dispose as special waste at \$60/ton; Assumes 1.5 tons/cu yd

Table F3-12. Alternative 5B: Dry Excavation of all Sediments &gt; PRG, Thermal Treatment

3	Trench Filter Fabric	sf	48930	\$1	\$48,930	Fabric along both sides and the bottom of the trench, and between the gravel backfill and the overlying soil backfill material
4	Gravel Backfill	tons	2718	\$20	\$54,367	From 4 ft to ~18 ft bgs, 3 ft wide; 1.5 tons/cu yd
5	Collection Pipe, 4-in HDPE Perforated	lf	1245	\$30	\$37,350	1165 ft of pipe in trench, 4 - 20 ft segments from the sumps to the header
6	Trenching, Backfill, and Compaction	cu yd	518	\$20	\$10,356	Soil material above the gravel in the trench; from 0 to 4 ft bgs; 1.5 tons/cu yd
7	Discharge Piping, 6-in HDPE	lf	1335	\$38	\$50,730	1165 ft of header pipe placed on ground surface, 170 ft from header pipe to WWTP
8	Connection to Sanitary Pump Station	ea	1	\$2,000	\$2,000	
9	Water Samples	ea	100	\$200	\$20,000	
10	Collection Sump	ea	4	\$2,000	\$8,000	
11	Sump Pump	ea	4	\$4,500	\$18,000	
12	Sump Level Controls	ea	4	\$2,500	\$10,000	
13	Electrical Conduit	lf	1245	\$10	\$12,450	1065 ft of conduit pipe placed on ground surface, and 4 - 20 ft segments from the sumps to the header
14	Misc. Electrical	ls	1	\$10,000	\$10,000	
15	Grout Ground Water Treatment System Trench at end of Project	cu yd	820	\$25	\$20,500	18 ft deep, 3 ft wide, 1165 lf; assumes 35% void space
				<b>Subtotal</b>	<b>\$570,632</b>	
<b>Lake Water Removal System Inside of Containment</b>						
<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	2 Pumps at 500 gpm w/ Operator to Initially Drain Bay	day	50	\$7,840	\$392,000	[\$85/hr x 8 hrs + 127.50/hr x 16 hr + \$1200/day pump] x 2; ~60,000,000 gal in Bay; 2 - 500gpm pumps = 1,440,000 gpd; added 8 add'l days for rain, gw, and lake water infiltration
2	Sump pumps variable discharge 10 to 100 gpm	ea	8	\$4,500	\$36,000	Dewater sediments
3	Collection/discharge piping, 12-in HDPE	lf	3280	\$5.50	\$18,040	Two collection pipes runs on land along Bay from the NW and NE corners of the Bay until reaching WWTP; Discharge pipe runs to the east to Lake Superior (east of the containment d
4	Connection to WWTP	ea	3	\$2,000	\$6,000	Two intake connections from each side of the Bay (West and East), one outgoing connection for treated water going to Lake Superior
5	Start-up Samples	ea	200	\$200	\$40,000	
6	Electrical Conduit	lf	1450	\$10	\$14,500	Runs on land along Bay to the west and east, connects up with the Ground Water Capture System conduit to the south
7	Connection to City Power Supply	ls	1	\$20,000	\$20,000	Connection and transformer
8	1 500 gpm Pump w/ Operator to Drain Bay 4 weeks each Spring	day	84	\$3,920	\$329,280	[\$85/hr x 8 hrs + 127.50/hr x 16 hr + \$1200/day pump] x 1; Assumes there will be 3 unworked winters between 4 working seasons
				<b>Subtotal</b>	<b>\$855,820</b>	
<b>Ground/Lake Water Treatment System</b>						
<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
<b>Year 2 Startup</b>						
	Carbon Adsorber System (1500 gpm)					Start-up is for approximately 50 days in Year 2 and 28 days in subsequent years 3 and 4.
1	Rental Initiation: mobilization, set-up, carbon	ea	2	\$49,335	\$98,670	Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
2	Rental**	Months	6	\$5,000	\$30,000	*There is a three month minimum rental for each of the two units
3	Rental Termination: carbon removal, demobilization	ea	2	\$41,935	\$83,870	
4	Oil Water Separator and associated system (200 gpm) (purchase)	ea	1	\$30,000	\$30,000	
5	Fuel and energy surcharge (estimated 8.65%)	ea	2	\$10,490	\$20,980	
6	Connecting piping, pumps, accessories	ea	1	\$20,000	\$20,000	
7	Operation and Maintenance (labor)	hours	900	\$100	\$90,000	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
	<b>Subtotal</b>				<b>\$373,520</b>	
<b>Year 2 During and After Startup</b>						
	Carbon Adsorption System and Bag System for Filtration (200 gpm)					Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
1	Rental Initiation: mobilization, set-up, carbon	ea	1	\$28,675	\$28,675	
2	Rental**	Months	6	\$1,500	\$9,000	**Six months for each units plus the first month that comes with the rental for a total of seven months use-time.
3	Rental Termination: carbon removal, system disassembly, demobilization	ea	1	\$39,350	\$39,350	
4	Carbon Exchange Rate	gallons	30000000	\$0.067	\$2,010,000	
5	BF-400 Four Bag Filter Skid	Months	7	\$4,000	\$28,000	
6	Filter Bags (5 micron rating) - Bag of 50	Cases	8	\$600	\$4,800	
7	Fuel and energy surcharge (estimated 8.65%)	ea	1	\$183,365	\$183,365	All filter bags will fill with fines and have to be disposed as special waste. Assumed average cost is \$60/ton.
8	Dispose soil in filter bags (special waste)	tons	17	\$60	\$1,020	Oil from oil/water separator will be collected in a 55 gallon drum and disposed as necessary.
9	Oil Disposal	gallons	200	\$3	\$600	
10	Operation and Maintenance (labor)	hours	2150	\$100	\$215,000	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
	<b>Subtotal</b>				<b>\$2,519,810</b>	
<b>Year 3, 4 Startup</b>						
	Carbon Adsorber System (1500 gpm)					Start-up is for approximately 50 days in Year 2 and 28 days in subsequent years 3 and 4.
1	Rental Initiation: mobilization, set-up, carbon	ea	4	\$49,335	\$197,340	Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
2	Monthly rental*	Months	12	\$5,000	\$60,000	*There is a three month minimum rental for each of the two units
3	Rental Termination: carbon removal, demobilization	ea	4	\$41,935	\$167,740	
4	Fuel and energy surcharge (estimated at 8.65%)	ea	2	\$18,385	\$36,769	
5	Operation and Maintenance (labor)	hours	1200	\$100	\$120,000	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
	<b>Subtotal</b>				<b>\$581,849</b>	
<b>Year 3, 4 During and After Startup</b>						
	Carbon Adsorption System and Bag System for Filtration (200 gpm)					Assumes activated carbon of lake water sufficient to discharge water back into Lake Superior
1	Rental Initiation: mobilization, set-up, carbon	ea	2	\$28,675	\$57,350	
2	Monthly rental**	Months	12	\$1,500	\$18,000	**Six months for each units plus the first month that comes with the rental for a total of seven months use-time.
3	Rental Termination: carbon removal, system disassembly, demobilization	ea	2	\$39,350	\$78,700	
4	Carbon Exchange Rate	gallons	30000000	\$0.067	\$2,010,000	
5	BF-400 Four Bag Filter Skid	Months	14	\$4,000	\$56,000	
6	Filter Bags (5 micron rating) - Bag of 50	Cases	16	\$600	\$9,600	
7	Fuel and energy surcharge (estimated 8.65%)	ea	2	\$96,432	\$192,865	All filter bags will fill with fines and have to be disposed as special waste. Assumed average cost is \$60/ton.
8	Dispose soil in filter bags (special waste)	tons	34	\$60	\$2,040	Oil from oil/water separator will be collected in a 55 gallon drum and disposed as necessary.
9	Oil Disposal	gallons	600	\$3	\$1,800	
10	Operation and Maintenance (labor)	hours	4900	\$100	\$490,000	Two employees for 50 hours per week for operations and maintenance. Operations (including startup) are to be maintained for 7 months per year for 4 years.
	<b>Subtotal</b>				<b>\$2,916,355</b>	
				<b>Subtotal</b>	<b>\$6,391,534</b>	Total for 3 years
<b>Subtotal, Water Removal and Treatment</b>					<b>\$7,817,986</b>	
<b>Thermal Treatment</b>						
<b>Item No.</b>	<b>Item</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total</b>	<b>Notes</b>
1	Thermal Treatment	ton	90018	\$100	\$9,001,800	Bid of \$80/ton plus misc items \$20/ton = \$100/ton



Table F3-12. Alternative 5B: Dry Excavation of all Sediments > PRG, Thermal Treatment

		Subtotal, Thermal Treatment		\$9,001,800	
<b>Sediment Transport and Disposal</b>					
<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>
1	Load, Transport, Dispose Sediments	ton	64350	\$46.80	\$3,011,580
2	Disposal of NAPL offsite	gal	5000	\$8	\$40,000
3	Cut Perimeter Sheet Pile Wall and Dispose of Piling	sf	10720	\$25	\$268,000
4	Remove Asphalt Drainage Pad and Dispose	sq yd	4170	\$10	\$41,700
Subtotal, Sediment Transport and Disposal				\$3,361,280	
<b>Miscellaneous</b>					
<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>
1	Develop HASP	ls	1	\$10,000	\$10,000
2	Health & Safety Personnel	wk	120	\$1,440	\$172,800
3	24 hr Security of Site	wk	200	\$2,695	\$539,000
Subtotal, Miscellaneous				\$721,800	
Subtotal:				\$52,457,608	
Engineering @ 15%:				\$7,868,641	
Oversight @ 15%:				\$7,868,641	
Subtotal:				\$68,194,891	
Contingency @ 25%:				\$13,114,402	
TOTAL:				\$81,309,293	
<b>Post-Construction</b>					
<u>Item No.</u>	<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Costs</u>	<u>Total</u>
1	Monitoring	yr	30	\$40,000	\$1,200,000
2	Reporting	yr	30	\$12,000	\$360,000
3	O&M	yr	30	\$10,000	\$300,000
Subtotal, Post-Construction				\$1,860,000	
Present worth @ 7% discount factor				\$715,090	
GRAND TOTAL:				\$82,024,383	